PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

United States Patent and Trademark Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 10 June 1998 (10.06.98)	
International application No. PCT/US97/16264	**Applicant's or agent's file reference** Y0996-184P
International filing date (day/month/year) 12 September 1997 (12.09.97)	**Priority date** (day/month/year) 13 September 1996 (13.09.96)
Applicant BEAMAN, Brian, Samuel et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

13 April 1998 (13.04.98)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Ting Zhao
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

Form PCT/IB/331 (July 1992)

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FOR THE PURPOSES OF INFORMATION ONLY

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INTERNATIONAL SEARCH REPORT

Interr ıal Application No
PCT/US 97/16264

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01R31/316 G01R1/073

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 225 777 A (BROSS) 6 July 1993 see column 5, line 53 - line 66; figure 4B	1-7, 10-34, 46,58-60
X	US 5 338 223 A (MELATTI ET AL.) 16 August 1994 see figure 1	1
A	DE 33 37 915 A (FEINMETALL) 24 May 1984 see figures 13-16	1-60
A	US 5 177 439 A (LIU ET AL.) 5 January 1993 cited in the application see claim 1	1

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 December 1997	22/12/1997

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hoornaert, W

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inte nal Application No
PCT/US 97/16264

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 593 966 A (IBM) 27 April 1994 cited in the application see figure 1 -----	1-30

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

.nformation on patent family members

Inter nal Application No
PCT/US 97/16264

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5225777 A	06-07-93	JP 2049372 C	25-04-96
		JP 6082481 A	22-03-94
		JP 7082030 B	06-09-95
US 5338223 A	16-08-94	JP 2511621 B	03-07-96
		JP 7049356 A	21-02-95
DE 3337915 A	24-05-84	CH 661129 A	30-06-87
		FR 2535064 A	27-04-84
		NL 8303621 A	16-05-84
US 5177439 A	05-01-93	NONE	
EP 593966 A	27-04-94	US 5371654 A	06-12-94
		JP 2514305 B	10-07-96
		JP 6204399 A	22-07-94
		US 5531022 A	02-07-96

PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
Y0996-184P		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US 97/ 16264	12/09/1997	13/09/1996
Applicant		
INTERNATIONAL BUSINESS MACHINES CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. [ ] **Certain claims were found unsearchable** (see Box I).

2. [ ] **Unity of invention is lacking** (see Box II).

3. [ ] The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing
   - [ ] filed with the international application.
   - [ ] furnished by the applicant separately from the international application,
     - [ ] but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
   - [ ] Transcribed by this Authority

4. With regard to the **title,**
   - [X] the text is approved as submitted by the applicant
   - [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   - [ ] the text is approved as submitted by the applicant
   - [X] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is:
   Figure No. 1
   - [ ] as suggested by the applicant.
   - [X] because the applicant failed to suggest a figure.
   - [ ] because this figure better characterizes the invention.
   - [ ] None of the figures.

International application No.
PCT/US 97/ 16264

INTERNATIONAL SEARCH REPORT

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

A structure comprising:
a substrate having a surface;
a plurality of elongated electrical conductors extending away from said surface;
each of said elongated electrical conductors having a first end affixed to said surface and a second end projecting away from said surface;
there being a plurality of said second ends;
a means for permitting each of said plurality of said second ends to move about reference positions.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 97/16264

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01R31/316 G01R1/073

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	DE 33 37 915 A (FEINMETALL) 24 May 1984 see figures 13-16 ---	1-60
A	US 5 177 439 A (LIU ET AL.) 5 January 1993 cited in the application see claim 1 --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
9 December 1997	22/12/1997

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hoornaert, W

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 593 966 A (IBM) 27 April 1994 cited in the application see figure 1 -----	1-30

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 97/16264

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5225777 A	06-07-93	JP 2049372 C	25-04-96
		JP 6082481 A	22-03-94
		JP 7082030 B	06-09-95
US 5338223 A	16-08-94	JP 2511621 B	03-07-96
		JP 7049356 A	21-02-95
DE 3337915 A	24-05-84	CH 661129 A	30-06-87
		FR 2535064 A	27-04-84
		NL 8303621 A	16-05-84
US 5177439 A	05-01-93	NONE	
EP 593966 A	27-04-94	US 5371654 A	06-12-94
		JP 2514305 B	10-07-96
		JP 6204399 A	22-07-94
		US 5531022 A	02-07-96

PATENT COOPERATION TREATY

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REC'D 24 NOV 1998
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference Y0996-184P	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US97/16264	International filing date *(day/month/year)* 12 SEPTEMBER 1997	Priority date *(day/month/year)* 13 SEPTEMBER 1996
International Patent Classification (IPC) or national classification and IPC IPC(6): G01R 01/073, 31/316 and US CL: 324/754, 755; 439/66, 91		
Applicant INTERNATIONAL BUSINESS MACHINES CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets.

   [✓] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 9 sheets.

3. This report contains indications relating to the following items:

   I [X] Basis of the report

   II [ ] Priority

   III [ ] Non-establishment of report with regard to novelty, inventive step or industrial applicability

   IV [ ] Lack of unity of invention

   V [X] Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   VI [ ] Certain documents cited

   VII [ ] Certain defects in the international application

   VIII [X] Certain observations on the international application

Date of submission of the demand 13 APRIL 1998	Date of completion of this report 29 OCTOBER 1998
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer VINH P. NGUYEN Telephone No. (703) 305-4914

Form PCT/IPEA/409 (cover sheet) (January 1994)*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US97/16264

I. Basis of the report

1. This report has been drawn on the basis of *(Substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments)*:

☐ the international application as originally filed.

☒ the description, pages (See Attached) , as originally filed.
pages _____ , filed with the demand.
pages _____ , filed with the letter of _____.
pages _____ , filed with the letter of _____.

☒ the claims, Nos. (See Attached) , as originally filed.
Nos. _____ , as amended under Article 19.
Nos. _____ , filed with the demand.
Nos. _____ , filed with the letter of _____.
Nos. _____ , filed with the letter of _____.

☒ the drawings, sheets/~~fig~~ (See Attached) , as originally filed.
sheets/~~fig~~ _____ , filed with the demand.
sheets/~~fig~~ _____ , filed with the letter of _____.
sheets/~~fig~~ _____ , filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☒ the description, pages NONE.
☒ the claims, Nos. NONE.
☒ the drawings, sheets/~~fig~~ NONE.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the ~~Supplemental Box~~ Additional observations below (Rule 70.2(c)).

4. Additional observations, if necessary:

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US97/16264

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims	1-60	YES
	Claims	NONE	NO
Inventive Step (IS)	Claims	1-60	YES
	Claims	NONE	NO
Industrial Applicability (IA)	Claims	1-60	YES
	Claims	NONE	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-60 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a probe sturcture having permitting means such as a sheet of material with a plurality of through holes in which the second ends of the elongated electrical conductors project therethrough.as recited in the instant claims..

---------- NEW CITATIONS ----------

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 13-16,26,36-43,52 and 56-57 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because the claims are indefinite for the following reason(s):

In claim 13, it is unclear what "a flexible support" represents. In claim 26, it is unclear what "means for holding said structure of claim 1" repesents.Is it shown in any of drawings. In claim 33, it is unclear what "a flexible support" repesents. Is it shown in any of drawings? In claim 36, "said probes" has no antecedent basis.In claim 43, it is unclear what "a thick frame" repesents. Is it shown in any of drawings? In claim 52, "said probes" has no antecedent basis. In claim 56, "the plurality of probe wires" has not been recited previously, therefore this term is indefinite. In claim 57,"said plurality of cylindrical collars" has no antecedent basis.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

I. BASIS OF REPORT:

This report has been drawn on the basis of the description,
pages, 1-16, as originally filed.
pages, NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the claims,
numbers, 15-31, as originally filed.
numbers, NONE, as amended under Article 19.
numbers, 1-14 AND 32-60, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the drawings,
sheets, 1-17, as originally filed.
sheets, NONE, filed with the demand.
and additional amendments:
NONE

CLAIMS

What is claimed is:

1. A structure comprising:

a substrate having a surface;

a plurality of elongated electrical conductors extending away from said surface;

each of said elongated electrical conductors having a first end affixed to said surface and a second end projecting away from said surface;

there being a plurality of said second ends;

a means for permitting each of said plurality of said second ends to move about reference positions.

2. A structure according to claim 1 wherein said first end is affixed to said surface at an electrical contact location.

3. A structure according to claim 1 wherein said means for permitting is a sheet of material having a plurality of through-holes therein through which said second ends project, therebeing a perforation in said sheet in the vicinity of said openings.

4. A structure according to claim 3 wherein said perforation comprises a plurality independent perforations about each of said through-hole.

5. A structure according to claim 3 wherein said perforation comprises a plurality of interconnected perforations about at least a part of said plurality of through-holes.

6. A structure according to claim 3 wherein said perforation a portion coupled to an adjacent through-hole.

7. A structure according to claim 3 wherein said perforation is adjacent to a plurality of said through-holes.

8. A structure according to claim 3 wherein said perforations form a cantilevered flap about at least one of said through-holes.

9. A structure according to claim 3 wherein said perforations form a cantilevered flap about more than one of said through-holes.

10. A structure according to claim 1 wherein at said second end there is disposed a structure selected from the group consisting of a protuberance and a sharp spike.

11. A structure according to claim 3 wherein said sheet is formed from a material selected from the group consisting of a rigid material and a compliant material.

12. A structure according to claim 3 wherein said sheet comprises a sheet of electrically conductive material having a plurality of through holes therein, said sheet of material contains a dielectric material to provide a means for preventing said elongated electrical conductors from electrically contacting said sheet of electrically conductive material.

13. A structure according to claim 3 wherein said sheet is spaced apart from said surface by a flexible support.

14. A structure according to claim 13 wherein said flexible support is selected from the group consisting of a spring and an elastomeric material.

15. A structure according to claim 1 wherein said elongated electrical conductors have a shape selected from the group consisting of linear, piece wise linear, curved and combinations thereof.

16. A structure according to claim 13 wherein said sheet and said flexible support form a space containing said plurality of elongated electrical conductors.

17. A structure according to claim 16 wherein said space is filled with a flexible material.

18. A structure according to claim 17 wherein said flexible material is an elastomeric material.

19. A structure according to claim 12 wherein said sheet has a top surface and a bottom surface and said through holes have a sidewall, said dielectric material coats said top surface and said bottom surface and said sidewall.

20. A structure according to claim 1 wherein said plurality of elongated electrical conductors are distributed into a plurality of groups.

21. A structure according to claim 20 wherein said plurality of groups are arranged in a array.

22. A structure according to claim 1 wherein said structure is a probe for an electronic device.

23. A structure according to claim 22 wherein said electronic device is selected from the group consisting of an integrated circuit chip and a packaging substrate.

24. A structure according to claim 21 wherein each of said groups corresponds to an integrated circuit chip on a substrate containing a plurality of said integrated circuit chips.

25. A structure according to claim 24 wherein said substrate containing said plurality of integrated circuit chips is a wafer of said integrated circuits chips.

26. An apparatus for using said structure of claim 1 to test an electronic device comprising:
means for holding said structure of claim 1, means for retractable moving said structure of claim 1 towards and away form said electronic device so that said second ends contact electrical contact locations on said electronic device, and
means for applying electrical signals to said elongated electrical conductors.

27. A structure according to claim 10 wherein said protuberance is spherelike.

28. A structure according to 3 wherein said sheet comprises a sheet of electrically conductive material having a plurality of first through holes therein, and a sheet of a dielectric material having a plurality of second through holes therein, said first through holes are aligned with said second through holes, said first through holes have a smaller diameter than said second through holes to provide a means for preventing said elongated electrical conductors from electrically contacting said sheet of electrically conductive material.

29. A structure according to claim 28 wherein sheet or electrically conductive material has a first side and a second side, said sheet of dielectric material is disposed on either of said first side and said second side of said sheet of electrically conductive material.

30. A structure according to claim 29, where there is disposed on said first side and said second side of said sheet of electrically conductive material a layer of said dielectric material.

31. A structure according to claim 3 wherein said sheet comprises a sheet of rigid material having a plurality of through holes therein, said sheet contains a

dielectric material to provide a means for preventing said elongated electrical conductors from electrically contacting said sheet of electrically conductive material.

32. A structure according to claim 3 wherein said sheet comprises a sheet of dielectric material having a plurality of through holes therein, said sheet contains a sheet of a rigid material disposed in contact with said sheet of dielectric material, said sheet of rigid material has on opening therein exposing a plurality or said through holes to provide a means for support of said dielectric material.

33. A structure according to claim 31 wherein said sheet is spaced apart from said surface by a flexible support, said sheet of rigid material is disposed on said flexible support.

34. An apparatus for making electrical contact with a plurality of bond pads on an integrated circuit device comprising:
a first fan out substrate having a first surface;
said first surface having a plurality of contact locations;
a plurality of ball bonds attached to said plurality of contact locations;
a plurality of wires extending outward from said ball bonds, away from said first surface on fan out substrate;
a plurality of ball shaped contacts on the ends of said plurality of wires;
a means for permitting each of said plurality of ball shaped contact to move about corresponding reference positions.

35. An apparatus according to claim 34, wherein said fan out substrate type includes but is not limited to the following:
multilayer ceramic substrates with thick film wiring;
multilayer ceramic substrates with thin film wiring;
metallized ceramic substrates with thin film wiring;
epoxy glass laminate substrates with copper wiring;
silicon substrates with thin film wiring.

36. An apparatus according to claim 34, further including a preformed frame of foamed elastomer material surrounding clusters, groupings, or arrays of said probes.

37. An apparatus according to claim 36, further including a layer of elastomer material surrounding said probes in said cluster.

38. An apparatus according to claim 37, further including a sheet of Invar material that has a thin coating of a polymer material and a plurality of openings corresponding to said plurality of ball shaped contacts.

39. An apparatus according to claim 37, further including a sheet of Invar material with a plurality of large diameter openings corresponding to said plurality of ball shaped contacts.

40. An apparatus according to claim 37, further including a sheet of polymer material with a plurality of small diameter openings corresponding to said plurality of ball shaped contacts place on top of said sheet of Invar material.

41. An apparatus according to claim ___, further including a sheet of polymer material with a plurality of openings corresponding to said plurality of ball shaped contacts.

42. An apparatus according to claim 41, further including a frame of Invar material attached to said sheet of polymer material with said plurality of openings corresponding to said plurality of ball shaped contacts.

43. An apparatus according to claim 38, further including a thick frame of Invar material attached to said sheet of Invar material with said thin coating of a polymer material and said plurality of openings corresponding to said plurality of ball shaped contacts.

44. An apparatus according to claim 39, further including a plurality of probes arrays corresponding to the location of a plurality of IC devices on a wafer.

45. An apparatus according to claim 36, further including a sheet of Invar material that has a thin coating of a polymer material and a plurality of openings corresponding to said plurality of ball shaped contacts.

46. A method comprising:

providing a substrate having a surface;

forming a plurality of elongated electrical conductors extending away from said surface;

each of said elongated electrical conductors having a first end affixed to said surface and a second end projecting away from said surface;

there being a plurality of said second ends;

providing a means for permitting each of said plurality of said second ends to move about reference positions.

47. A structure according to claim 3 wherein said sheet is formed and material selected from the group consisting of Invar, Cu/Invar/Cu, molybdenum, polyimides.

48. A structure according to claim 3 wherein said sheet is formed from a material selected from the group consisting of a metal, a polymer, a semiconductor and dielectric.

49. A structure according to claim 42 wherein said dielectric is selected from the group consisting of a ceramic and a glass.

50. An apparatus for making electrical contact with a plurality of aluminum bond pads on an integrated circuit device comprising:

a first fan out substrate having a first surface;
said first surface having a plurality of contact locations;
a plurality of ball bonds attached to said plurality of contact locations;
a plurality of wires extending outward from said ball bonds, away from said first surface on fan out substrate.
a plurality of ball shaped contacts on the ends of said plurality of wires.

51. A high density probe according to claim 1, wherein said fan out substrate type includes but is not limited to the following:

multilayer ceramic substrates with thick film wiring
multilayer ceramic substrates with thin film wiring
metallized ceramic substrates with thin film wiring
epoxy glass laminate substrates with copper wiring
silicon substrates with thin film wiring

52. A structure according to claim 1, further including a layer of elastomer material surrounding said probes.

53. A structure according to claim 3, further including a sheet of polymer material with a plurality of cantilever flaps and openings corresponding to said plurality of ball shaped contacts.

54. A structure according to claim 4, further including an epoxy material used to bond the plurality of ball shaped contacts to the corresponding openings in the cantilever flaps.

55. A structure according to claim 5, wherein the action of mating the plurality of probes to the plurality of flat or recessed contacts on the IC device causes said plurality of ball shaped contacts to wipe against the IC contacts.

56. A structure according to claim 3, further including a plurality of cylindrical collars concentrically located on the plurality of probe wires and positioned between the top surface of said elastomer material and the ball shaped contact on the end of said probe wires.

57. A structure according to claim 7, further including a sheet of polymer material with a plurality of openings corresponding to said plurality of cylindrical collars concentrically located on the plurality of probe wires.

58. A structure according to claim 6, further including a plurality of probes arrays corresponding to the location of a plurality of IC devices on a wafer.

59. A structure according to claim 1 where in said means for permitting is a sheet of material having a plurality of openings therein through which said second ends project.

60. A method according to claim 46 further including moving said second ends into contact with a workpiece, said second ends moving about said reference positions.